REMARKS

In the last Office Action, claims 1-4, 6 and 7 were rejected under 35 U.S.C. §102(b) as being anticipated by U.S. Patent No. 6,331,159 to Amano et al. ("Amano '159"), and claims 1, 4 and 5 were rejected under 35 U.S.C. §102(b) as being anticipated by U.S. Patent No. 5,941,837 to Amano et al. ("Amano '837").

The Examiner acknowledged applicant's claim for foreign priority under 35 U.S.C. §119 and noted that a certified copy of the priority document has not yet been received. The Examiner also indicated acceptance of the drawings filed with the application.

The Examiner commented that claims 1, 4 and 5 use "for" in the functional limitation of the elements recited, which the Examiner contends is a recitation of the intended use of the claimed invention, which must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art.

In accordance with this response, claims 1-7 have been amended to more clearly patentably distinguish over the prior art and to delete the "for" language noted by the Examiner. As presently worded, the claims recite in a positive manner the structure and function of the elements as

opposed to reciting, as contended by the Examiner, the intended use of the claimed invention. The specification has been amended in editorial respects to correct obvious informalities.

Applicant respectfully requests reconsideration of his application in light of the foregoing amendments and the following discussion.

The present invention is directed to a Fourier transform processing apparatus and to a pulse wave detecting apparatus incorporating the Fourier transform processing apparatus which can accurately measure pulse rates even when using a calculation unit that has a low calculating capability.

As described in the specification, it is known in the art to reduce the influence of noise on detected signals by obtaining moving averages of the sampled signals. By performing a Fourier transform process on the moving-average signals, the influence of noise can be reduced and more accurate measurement can be obtained. However, since the number of moving-averaged data is equal to the number of data before the averaging, an increase in the number of data to be Fourier-transformed correspondingly increases the load on the calculation unit that performs the Fourier transform. Consequently, in the case of apparatus having a calculation

unit with a low calculating capability, the sampling frequency cannot be set sufficiently high to obtain a high accuracy of measurement.

The present invention addresses this problem in a novel manner by use of a modified moving average process circuit that sequentially averages, without duplication, every predetermined number of sampled signals and outputs resultant signals to a Fourier transform circuit, thereby reducing the number of data processed by the Fourier transform circuit. As described in the specification on page 9, line 13 through page 10, line 4, a modified moving average process circuit 107 sequentially averages every two of the signals Y0, Y1, and so on output by the A-D conversion circuit 106 without duplication to calculate output signals (Y0 + Y1)/2, (Y2 + Y3)/2, and so on. This process of sequentially averaging every two of the signals without duplication is referred to as a "modified moving average". The modified moving average process circuit 107 outputs digital signals (Y0 + Y1)/2, (Y2 + Y3)/2, and so on having a frequency that is one half of the sampling frequency of the A-D conversion circuit 106 as indicated by the broken line in Fig. 2.

Independent claims 1 and 4 have been amended to specify that the averaging process unit, such as the modified moving average process circuit 107, sequentially averages <u>without duplication</u> every predetermined number of signals from

the sampling process unit and sequentially outputs resultant signals at a second frequency which is lower than the first frequency (sampling frequency). The prior art of record does not disclose or suggest an averaging process unit that sequentially averages without duplication every predetermined number of signals from a sampling process unit.

The reference to Amano '159, which was applied in rejecting independent claims 1 and 4, discloses a pulse wave detecting apparatus having a microcomputer 4 that includes an averaging process unit for averaging a pulse waveform. More particularly, as described in column 23, lines 4-12, the microcomputer 4 superimposes the radius artery waveforms over a plurality of beats and obtains the average waveform per beat over a fixed interval of time. Each pulse waveform corresponds to one beat. This means, for example, (beat 1 + beat 2 + beat 3 + beat 4)/4 as shown in Fig. A of the annexed Appendix, and the number of data which is used in the microcomputer 4 is not reduced. In other words, the microcomputer 4 of Amano '159 does not sequentially average <u>without duplication</u> every predetermined number of signals from a sampling process unit and sequentially output resultant signals at a frequency lower than the sampling frequency, as required by claims 1 and 4.

Amano '837 was also applied against independent claims 1 and 4, and this reference discloses a pulse wave detecting apparatus, in which a CPU 1 functions as an averaging process unit and averages a pulse waveform. More particularly, as described at column 25, lines 49-53, the CPU 1 calculates the moving average of the slope of the waveform over a fixed time interval using overlapping data as shown in Fig. B of the Appendix. The CPU 1 does not sequentially average <u>without duplication</u> every predetermined number of signals from a sampling process unit and sequentially output resultant signals at a frequency lower the sampling frequency, as required by amended independent claims 1 and 4. In Amano '837, like Amano '159, the number of data used in the CPU 1 is not reduced by the averaging process unit incorporated in the CPU 1 because the sampled signals are not sequentially averaged without duplication as in the case of the claimed invention.

The cited but not applied references have been considered; however, is not seen where these references cure the deficiencies of Amano '159 and Amano '837. Neither of the two cited but not applied references discloses an averaging process unit that sequentially averages without duplication every predetermined number of signals from a sampling processing unit and sequentially outputs resultant signals at

a frequency lower than the sampling frequency. Thus the combined teachings of the prior art do not disclose, suggest or render obvious the claimed invention.

In view of the foregoing, the application is now believed to be in allowable form. Accordingly, favorable reconsideration and passage of the application to issue are respectfully requested.

Respectfully submitted,

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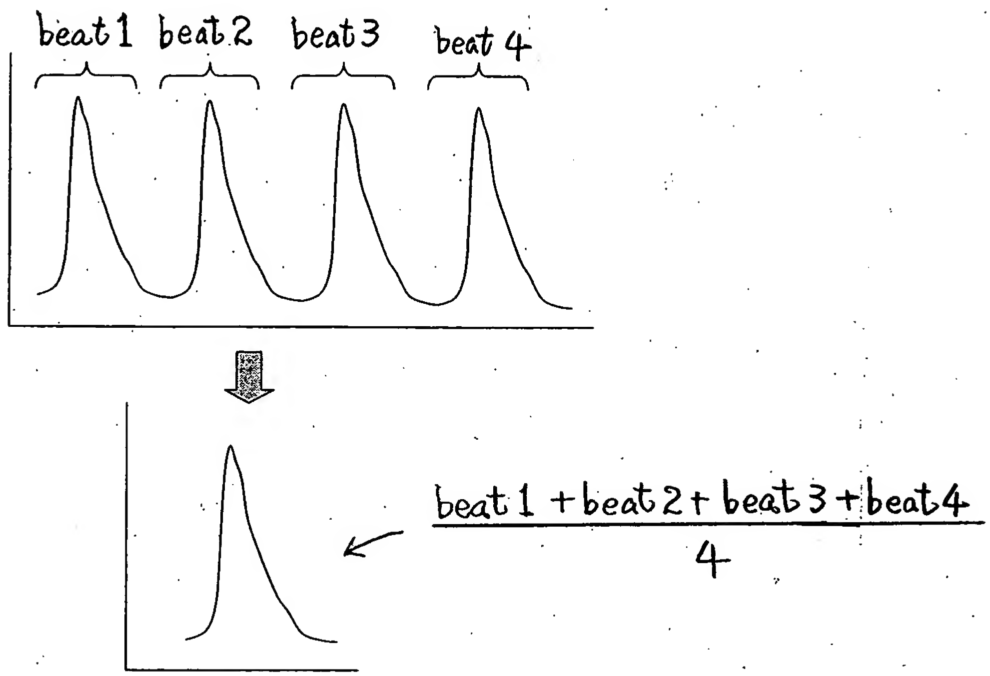
Debra Buonincontri
Signature

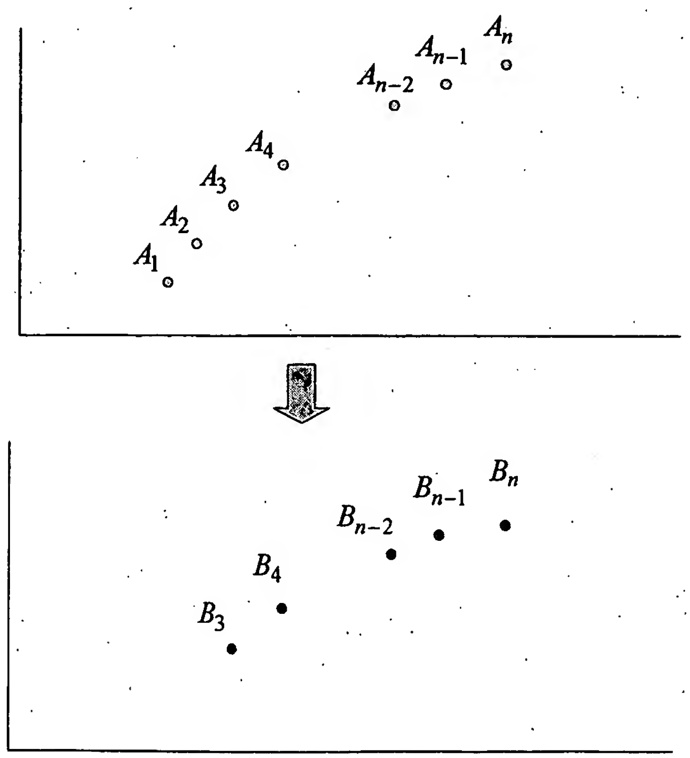
March 9, 2006
Date

Appendix

Averaging Processing in '159 (Fig. A)



Moving Averaging Processing in '837 (Fig. B)



three value moving averaging

$$B_n = \frac{1}{3}\sum_{k=0}^{2} A_{n-k}$$